

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 2044 GC-3 Your Roll No.....

Unique Paper Code : 32171302

Name of the Paper : Organic Chemistry-II (Oxygen Containing Functional Groups)

Name of the Course : B.Sc (Hons.) Chemistry (CBCS)

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **any six** questions.
3. Question No. 1 carries 15 marks.

1. (a) An organic compound 'A' ($C_4H_6O_3$) on reaction with ethyl alcohol gives a carboxylic acid 'B' ($C_2H_4O_2$) and another compound 'C' ($C_4H_8O_2$). Compound 'C' on hydrolysis under acidic conditions gives 'B' and 'D'. Oxidation of 'D' with $KMnO_4$ also gives 'B'. Compound 'B' on heating with $Ca(OH)_2$ gives 'E' (C_3H_6O). 'E' forms 2,4-DNP derivative but does not give Tollen's or Fehling's test. Identify 'A' to 'E' and write all the reactions involved. Give mechanism of acid catalyzed hydrolysis of compound 'C'.

(b) Write one test with reaction involved to distinguish the following pairs of compounds.

(i) n-Propyl alcohol and tert-butyl alcohol

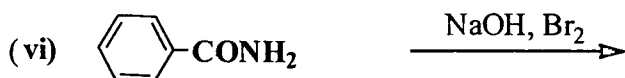
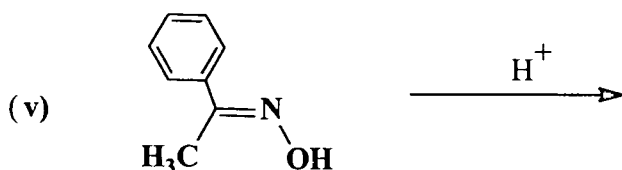
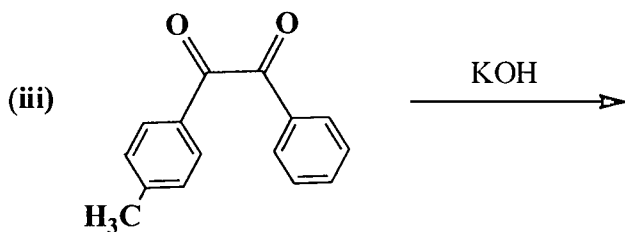
(ii) Acetone and diethyl ketone

(iii) Acetaldehyde and acetophenone.

(9, 6)

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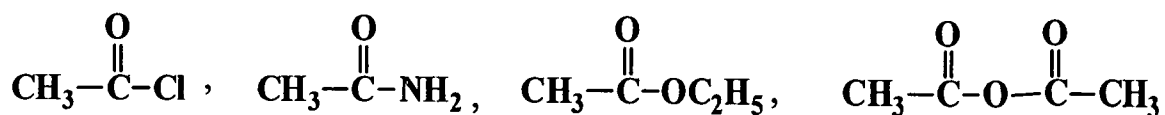
2. (a) Complete the following and give the name of the reaction in each case.



(b) Write the structure of alcohol formed from $(\text{CH}_3)_2\text{C}=\text{CH}-\text{CH}_3$ on hydroboration-oxidation and give the mechanism involved. (9,3)

3. (a) How will you distinguish between α , β , γ and δ hydroxy acids by application of heat? Explain by giving equations.

(b) Arrange the following compounds in order of increasing reactivity towards nucleophiles and give reasons



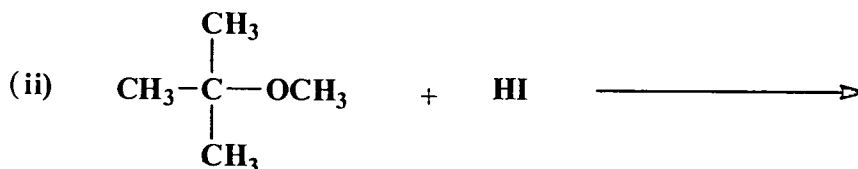
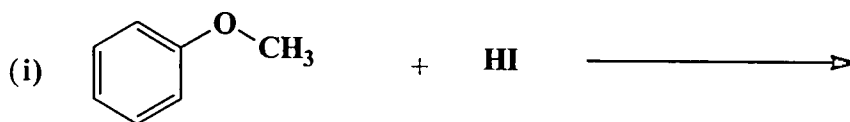
- (c) Predict the product of the reaction of 1-bromo-1-methyl cyclohexane with
- Sodium ethoxide in ethanol
 - Refluxing ethanol

(4 × 3)

4. (a) Write the sequence of reactions for the preparation of

- n-Propylbenzene from benzene
- 2-Methylpropene by Wittig reaction.

- (b) Write the products and explain their formation in the following reactions giving the steps involved



(6 × 2)

5. Explain why

- p-Dimethylamino benzaldehyde does not undergo Cannizzaro reaction
- Magnesium or cadmium is not used in place of zinc in Reformatsky reaction
- Allyl chloride is more reactive than 1-chloropropane towards nucleophilic substitution
- Diethyl ether has lower boiling point and lower water solubility as compared to that of 1-butanol.

(3 × 4)

6. (a) Write the synthesis of the following compounds using ethylacetoacetate or diethylmalonate

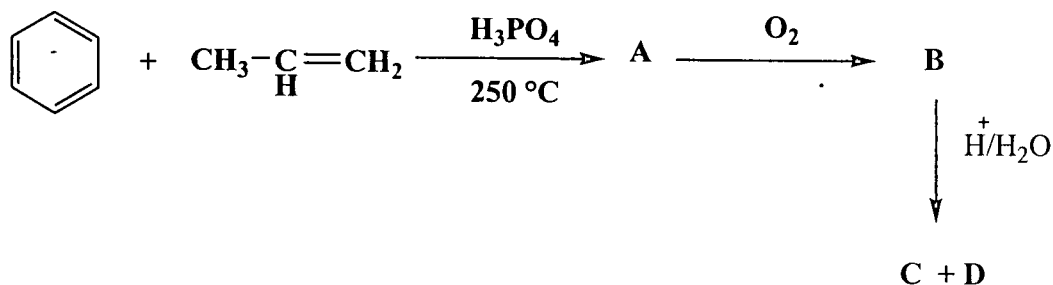
- Cinnamic acid
- 3-Methyl-2-pentanone

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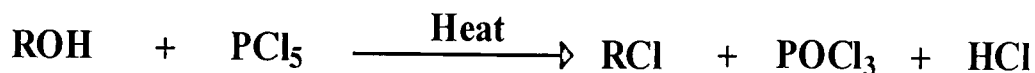
(iii) 5,5-Diethyl barbituric acid

(b) Explain with mechanism the formation of m-toluidine along with p-toluidine on reaction of p-chlorotoluene with NaNH_2 in liquid NH_3 . (9, 3)

7. (a) Write the structure of the compounds A, B, C and D and give mechanism for the formation of compound C and D from B.



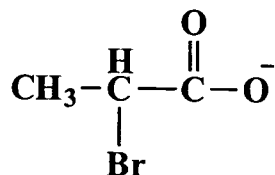
(b) Write down the mechanism for the following reaction



(c) Explain why,

(i) Chlorobenzene is not as reactive as ethyl chloride.

(ii) Substitution of bromine in the following compound proceeds with retention of configuration. (4 × 3)



8. Write short notes on any **THREE** of the following

(a) Cannizzaro reaction

(b) Base catalysed ester hydrolysis

(c) Dieckmann reaction

(d) Claisen condensation

(4 × 3)

(1500)